FIRST TEXAS RECORDS OF FIVE GENERA OF AQUATIC BEETLES (COLEOPTERA: NOTERIDAE, DYTISCIDAE, HYDROPHILIDAE) WITH HABITAT NOTES[1]

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ABSTRACT: Five genera of aquatic beetles are reported from Texas for the first time. Species recorded include *Suphis inflatus* (Noteridae), *Hoperius planatus* (Dytiscidae), *Dibolocelus ovatus*, *Hydrobiomorpha casta*, and *Sperchopsis tessellata* (Hydrophilidae). Habitat notes are reported for four of these. In addition, some locality and habitat data are provided for *Helobata larvalis* (Hydrophilidae) which has only recently been recorded from Texas as *Helobata striata*. Label data are listed for 168 specimens representing the six genera in Texas.

This paper is a fortuitous result of surveys made from 1991 to 1995 on the Haliplidae of Texas by the senior author, and on potential predators of Culicidae larvae in the upper Gulf Coast region of Texas by the junior author. Five genera of aquatic Coleoptera previously unreported from Texas were encountered in our samples. Additional information was obtained from material in the Insect Collection of the Department of Entomology at Texas A&M University (TAMU). Recorded localities and ranges for each species and available habitat notes are presented. Each of these genera is either monotypic or is represented in the United States by a single species. Unless otherwise indicated, the collection data represent single specimens and the identifications were made or confirmed by the authors. Specimens collected by the authors are indicated by their initials in the locality data. The sexes of the beetles are given when known. Habitats from which more than one of these species were collected are described under the first species listed, and referred to briefly in subsequent species discussions. Many of the collections were made at the Runnell's Family Mad Island Preserve, southwest of Houston, and the Roy E. Larsen Sandyland Sanctuary, north of Beaumont (both of which are properties of The Nature Conservancy of Texas), the Anahuac National Wildlife Refuge, just east of Houston, and the J.D. Murphree Wildlife Management Area, south of Port Arthur. Representative specimens from this study are deposited in the Insect Collection of the Department of Entomology at Texas A&M University.

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NOTERIDAE

Genus *Suphis* Aubé 1836

Suphis inflatus (LeConte)

Colpius inflatus LeConte 1863: 22
Copius inflatus; Arnett 1973: 205
Coepius inflatus; Arnett 1983: 9-1
Suphis inflatus; Spangler and Folkerts 1973: 501

Suphis inflatus (LeConte) was originally described in the genus *Colpius*. Spangler and Folkerts (1973) transferred this species to *Suphis* and described its third instar larva. This is the only known representative of the genus in the United States. This beetle has been listed from Florida and Louisiana (Crotch and Cantab 1873, Young 1954 [in *Colpius*], Spangler and Folkerts 1973, Arnett 1973 [in *Copius*], 1983 [in *Coepius*]). Later it was recorded from Alabama, Georgia and South Carolina (Spangler and Folkerts 1973, Folkerts and Donovan 1974). Brigham *et al.* (1982) found this species in both North and South Carolina. A New York locality followed by a question mark was listed by Crotch and Cantab (1873), but this record is very doubtful as *Suphis inflatus* has not been reported from the Northeast by any other author. The records here extend the known range of this species westward from Louisiana to Brazos and Matagorda Counties of southeastern Texas (Map 1).

The habitat of *S. inflatus* is characterized as "sinkhole ponds, lakes and marshes" and it "...apparently prefers relatively permanent bodies of water, often of low pH" (Young 1954). The habitats at the following localities are consistent with those previously recorded. Alligator Lake, located in the Roy E. Larsen Sandyland Sanctuary of southeastern Texas, had a pH of 4.5 and is a large, shallow, catchment lake mostly covered with *Nymphaea* sp. Shoveler's Pond, located in the Anahuac National Wildlife Refuge just east of Houston, is a large, permanent pond with several types of submergent and emergent vegetation and *Lemna* sp. None of the specimens of *S. inflatus* collected in our study were taken at lights except those in underwater light traps. This suggests that this species rarely leaves the water or has diurnal flight activity. Fifty-two specimens were taken in seven counties.

TEXAS RECORDS. Brazos Co.: Postoak Lake, TAMU, 18 Jul 1972, J. Roberts. **Chambers Co.**: Large shallow pool just E of Trinity River @ IH 10, 9 Aug 1991, SKJ. Anahuac National Wildlife Refuge, Shoveler's Pond, 7 Jun 1993, RCV. **Hardin Co.**: Roy E. Larsen Sandyland Sanctuary, Alligator Lake, 18 Aug 1992, 2 adults; 17 May 1993, 6 adults; 3 Sep 1994, 4 adults; underwater light trap, 4 Sep 1994, 2 adults, SKJ. Roy E. Larsen Sandyland Sanctuary, temporary pool, 18 Aug 1992, 2 adults; 17 May 1993, SKJ. **Jefferson Co.**: Hwy 365W, 2.3 km W of 823N,

marsh, 11 Aug 1991, SKJ. **Matagorda Co.**: Mad Island Slough N of lake, underwater light trap, 19 Jun 1993, SKJ. **San Jacinto Co.**: pond on Loop 424, 0.48 km N of Shepherd, 6 Sep 1992, SKJ. **Tyler Co.**: marsh of Steinhagen Lake, @ Hwy 90 just W of Martin Dies Cherokee Unit, 21 Jul 1991, 3 adults; 31 Aug 1991, SKJ. Temple-Inland Forest Lake Club @ swamp, 27 Mar 1993, 6 adults, SKJ; 10 Jun 1995, 19 adults, J.R. Gibson.

DYTISCIDAE

Genus *Hoperius* Fall 1927

Hoperius planatus Fall

Hoperius planatus Fall 1927: 177

The monotypic genus, *Hoperius*, was described from a single male specimen taken at lights in Hempstead County, Arkansas (Fall 1927). In addition to Lawrence County, Arkansas, Spangler (1973a) reported it from Talbot County, Maryland, Florence and Horry Counties, South Carolina [from Kirk 1970], and Nansemond County, Virginia. A single specimen taken at lights in Elmore County, Alabama, was reported by Folkerts and Donovan (1974), extending the range of this species southward in the United States. Michael and Matta (1977) summarized the known distribution of *Hoperius planatus* as "south from Maryland to South Carolina and west to Alabama and Arkansas." Anders Nilsson (pers. comm., 1994) confirms that the species has not previously been reported from Texas. Our collection data indicate a southwestern range extension from Arkansas to Montgomery County in southeastern Texas (Map 1).

Michael and Matta (1977) stated "This is strictly a woodland pool species." Spangler (1973a) reported collecting both adults and immatures of *H. planatus* on several occasions in Talbot County, Maryland, in woodland ponds which lacked living vegetation but contained rotting leaves. In the same paper, he described the third instar larva and the pupa. The three specimens from Hardin County, in southeastern Texas, were collected by dip net from a swamp with a depth of less than 20 cm. The only macrophytes in the swamp were the black gum trees and the bottom was covered with decaying leaves over a firm sand substrate. The water had a pH of 4.5 and a very low dissolved oxygen level of 1.2 ppm. All specimens of *H. planatus* from Montgomery County were taken at lights (Wappes, pers. comm., 1995). Intensive collecting efforts with dipnets, underwater light traps, bottle traps, and both mercury vapor and ultraviolet lights at the Roy E. Larsen Sandyland Sanctuary failed to produce more specimens. This beetle indeed deserves its common name, "the rare predacious diving beetle." Eight specimens have been collected from two Texas counties.

TEXAS RECORDS. Hardin Co.: Roy E. Larsen Sandyland Sanctuary, swamp of *Nyssa sylvatica*, 19 Aug 1992, female; 18 May 1993, 2 males, SKJ. **Montgomery Co.**: The Woodlands, 5-7 Apr 1978, female; 20-23 Apr 1978, one male, one female; 12 May 1978; 2 May 1980, male, J.E. Wappes.

HYDROPHILIDAE

Genus *Dibolocelus* Bedel 1891

Dibolocelus ovatus (Gemminger and Harold)

Hydrophilus ovalis Ziegler 1844: 45 (nec Laporte 1840)
Hydrophilus ovatus Gemminger and Harold 1868: 476 (nom. nov.)
Dibolocelus ovatus; Young 1954: 196

The genus *Dibolocelus* is represented in the United States by a single species, *D. ovatus* (Gemminger and Harold). *Dibolocelus* superficially resembles *Hydrophilus* in general size and habitus, but differs in having the prosternum completely divided into two lobes, pubescence on the abdominal sternites, a characteristic body shape, and sexually dimorphic maxillary palpi. Hansen (1991) reduced *Dibolocelus* to a subgenus of *Hydrophilus* based on his claim that these characters are autapomorphies. After having studied his argument and obtained the opinions of other coleopterists specializing in the Hydrophiloidea (M. Archangelsky, A. Smetana, S. Testa, pers. comms., 1995), we have decided to accept the generic status of *Dibolocelus* in this paper based on several morphological characters in both the larval and adult stages. *Dibolocelus* has a strictly New World distribution while *Hydrophilus* (*s.s.*) is found worldwide.

Young (1954) reported *D. ovatus* as ranging from New York, west to Michigan and Indiana, and south to Florida. Wooldridge (1967) added Illinois to the range. This distribution in the eastern United States was extended northward into Canada with records from Ontario and Quebec (Bousquet 1991). In the southern United States, Testa and Lago (1994) extended the range of *D. ovatus* westward to Mississippi. Two adult specimens, used for producing offspring in studies of the preimaginal stages of the species, were reported by Archangelsky and Durand (1992) from a seemingly disjunct population in Latimer County, Oklahoma. The only documented previous collections of *D. ovatus* in Texas were recorded by Foster (1972) in his unpublished thesis. The two specimens he recorded were taken on 4 May 1959 and 5 May 1962 from unknown locations in Nacogdoches Co. in eastern Texas. The specimens were not examined, but because the identifications were made by D.P. Wooldridge, an authority on the Hydrophiloidea, they are considered reliable. Our records extend the known distribution of this species westward into Texas to Hidalgo and Cameron Counties (Map 1).

Several authors have documented the preference of *D. ovatus* for large, deep, well-vegetated bodies of standing water (Young 1954, Smetana 1988). This beetle has also displayed a propensity for being attracted to lights. Kirk (1970) reported *D. ovatus* being taken at lights in July at Myrtle Beach, South Carolina, and all of our specimens for which data are available were collected at lights. Testa and Lago (1994) concluded that specimens of *D. ovatus* are "not encountered frequently." This is a large beetle (27-32 mm) and our collections from Texas confirm that it is rarely taken as compared to other large aquatic beetles. Archangelsky and Durand (1992) added considerably to the knowledge about this genus and species by observing its bionomics and describing the preimaginal stages from specimens reared in the laboratory. Twenty-one specimens from eleven counties are recorded here.

TEXAS RECORDS. Bee Co.: Beeville, 7 Sep 1938, male, C.G. Johnson. **Brazos Co.**: College Station, 16 Apr 1951, female, H.J. Reinhard; 17 Apr 1977, male, R.S. Peigler; 10 Oct 1977, male, J.J. Smith. **Cameron Co.**: Brownsville, 23 Jun 1938, female; 15 Aug 1938, female, D.C. Earley. **Chambers Co.**: Anahuac, Mosquito Control District Building, at mercury vapor lights, 22 Apr 1994, male; 27 Jun 1994, male; 2 Oct 1994, female, RCV. **Hidalgo Co.**: Tex. Exp. Sta., light trap, 16 Jun 193?, female, J.C. Gaines. **Jefferson Co.**: J.D. Murphree Wildlife Management Area Main Office on SH 73, mercury vapor light, 28 Apr 1995, one male, one female, RCV. **Matagorda Co.**: 16 km N Palacios, 11 Mar 1991, male, Kenny Sexton. Mad Island Preserve, at light, 18 Jun 1993, SKJ & W.B. Godwin. **Montgomery Co.**: The Woodlands, 28-29 Apr 1978, one male, one female; 7 Apr 1980, female, J.E. Wappes. **Nacogdoches Co.**: 4 May 1959; 5 May 1962, det. D.P. Wooldridge. **San Patricio Co.**: Welder Wildlife Ref., 27 Jun 1969, female, Board & Hafernik. **Wood Co.**: Mineola Civic Center, at lights, 19 Mar 1987, male, W.B. Godwin.

Genus *Hydrobiomorpha* Blackburn 1889

Hydrobiomorpha casta (Say)

Hydrophilus castus Say 1835: 170
Hydrocharis obtusatus (Say); LeConte 1855: 369
Hydrous tenebrioides Jacquelin DuVal 1856: 50
Hydrocharis perfectus Sharp 1882: 61
Hydrocharis castus; Horn 1876: 251
Hydrophilus (*Neohydrophilus*) *castus*; d'Orchymont 1911: 62
Neohydrophilus castus; Knisch 1924: 234
Hydrobiomorpha casta; Mouchamps 1959: 328

Hydrobiomorpha casta (Say) was reported by Young (1954) as *Neohydrophilus castus* in the southern United States from Florida to Louisiana. Spangler (1973b) expanded this distribution to the south to include Cuba,

Mexico, Guatemala, and Panama. Brigham *et al.* (1982) added both North and South Carolina to the known range, extending the distribution northward in the United States. Our records indicate a spread in distribution to Chambers and Hardin Counties in southeastern Texas which represent the westernmost range in the United States presently known for this hydrophilid (Map 1).

Young (1954) characterized the habitat of *H. casta* as "...cypress ponds, roadside ditches, sinkhole ponds, and swamps principally in the flatwoods" and further stated that this beetle was found "infrequently." Testa and Lago (1994) collected specimens only at lights, mostly near a small eutrophic woodland lake and a large, well-established lily pond. The majority of our specimens from Chambers County, Texas, were collected in a large marsh when the salinity ranged from 2 to 4 ppt. Specimens from Jefferson County, Texas, were collected in a marsh during a period when the salinity ranged from 2 to 9 ppt. Both marshes had experienced higher salinity levels than the ranges shown here, but none of these beetles were taken during those periods. The vegetation at both marshes is predominately *Spartina patens* (Ait.) Muhl. Ecological notes on Alligator Lake, in southeastern Texas, are included in the discussion of *Suphis inflatus*. Grass Pond, located in the Roy E. Larsen Sandyland Sanctuary in southeastern Texas, is a large, shallow pond which dries completely during some years. At its maximum extension, the outer portion is swamp with tree cover (*Pinus taeda* L. and *Nyssa sylvatica* Marsh.) and the firm sand bottom is completely covered with sphagnum moss. This grades into an area of grass which extends for about 30 meters. The large central area has more sphagnum and about 10% cover by *Nymphaea* sp. The pH was 5.6 in August, 1992. More than half of all specimens collected in this study were taken with submerged bottle traps like those described by Hilsenhoff (1987), and perhaps the success in collecting this species was due to use of these traps. The third instar larva of *H. casta* was described by Spangler (1973b) from a specimen collected in Bibb County, Alabama. Texas records include 40 specimens collected from three counties.

TEXAS RECORDS. Chambers Co.: Double Bayou, at light, 6 Jun 1975, J.S. Ashe & M.L. Holcomb. Anahuac National Wildlife Refuge, 4.9 km SE of Visitor Info Booth, marsh, 12 Jul 1993; 13 Jul 1993, 2 adults; 5 Mar 1994, 2 adults; 19 Mar 1994, 2 adults; 9 Apr 1994, 3 adults; 23 Apr 1994, 2 adults; 7 May 1994; 25 May 1994; 16 Jun 1994, 3 adults; 28 Jun 1994, 4 adults; 12 Jul 1994, 2 adults; 26 Jul 1994; 23 Aug 1994, 1 larva and 2 adults; 30 May 1995, RCV. **Hardin Co.**: Roy E. Larsen Sandyland Sanctuary, Grass Pond, 18 May 1993, SKJ; Roy E. Larsen Sandyland Sanctuary, mercury vapor light by Alligator Lake, 3 Sep 1994, 5 adults, SKJ. Alligator Lake, 3 Sep 1994, SKJ. **Jefferson Co.**: J.D. Murphree Wildlife Management Area, 11 km S of Port Arthur, 0.16 km E of Lost Lake, brackish marsh, 6 Mar 1994; 23 Aug 1994, RCV. J.D. Murphree Wildlife Management Area Main Office on SH 73, mercury vapor light, 28 Apr 1995, 2 adults, RCV.

Genus *Sperchopsis* LeConte 1862

Sperchopsis tessellata (Ziegler)

Spercheus tessellatus Ziegler 1844: 44
Sperchopsis tesselatus; LeConte 1862: 47
Hydrobius tesselatus; Horn 1873: 133
Hydrobius tessellatus; Horn 1890: 266
Spercheus tesselatus; Schwarz and Barber 1918: 135
Hydrocyclus tesselatus; Knisch 1921: 102
Hydrocyclus tessellatus; Winters 1926: 53
Sperchopsis tessellatus; d'Orchymont 1928: 93
Sperchopsis tessellata; Smetana 1988: 72

Sperchopsis is a monotypic genus originally described by LeConte (1862). Spangler (1961) provided an excellent review of the nomenclature, biology, and distribution of *Sperchopsis tessellata* (Ziegler), and described its larvae and pupa. This species has been recorded from numerous states and provinces in eastern North America, ranging from Nova Scotia and Ontario, Canada, south to Florida and Arkansas (Young 1954, Spangler 1961, Kirk 1969, 1970, Arnett 1973, 1983, Brigham *et al.* 1982, Warren 1985, White *et al.* 1985, Smetana 1988, Bousquet 1991, Testa and Lago 1994). Our records extend the known range of *S. tessellata* into East Texas, with Brazos County representing the westernmost point of known distribution in the United States (Map 1).

The typical habitat of *Sperchopsis* was characterized by Young (1954) as "...fairly swift, sand-bottomed streams, where it occurs in leaf drift in eddies and backwaters or clinging to logs and debris" and by Spangler (1961) as "margins of cold, clear, rapidly flowing streams," and especially "undercut gravelly and sandy stream banks with overhanging roots..." This type of lotic habitat is unusual for most hydrophilid beetles, and undersampling of this habitat is probably one of the reasons for its scarcity in most collections. Although Warren (1985) routinely sampled typical *Sperchopsis* habitat at 175 sites in Kentucky, he found only one adult and one larva in two streams which had sandy to gravelly undercut banks with overhanging roots or vegetation.

Kirk (1969, 1970) recorded *S. tessellata* in South Carolina from tanglefoot screens located between cotton fields, or between cotton fields and woodlands, and also from beach drift on the shores of lakes, bays or oceans. These habitats depart from the "typical" reported habitat for *Sperchopsis* and probably indicate dispersing individuals. The habitats recorded here (coarse particulate organic matter [CPOM], submerged dead limb, and drift in streams) agree with what is considered "typical" habitat for this species. Likewise, the

Winter's Bayou specimens, from San Jacinto County in southeastern Texas, were collected from dead branches in a sandy-bottomed stream. A total of twenty-nine specimens are reported from five counties in Texas.

TEXAS RECORDS. Anderson Co.: Boxes Creek (in drift), on submerged dead limb, 6 Nov 1960, 11 adults, H.R. Burke. 16 km SW of Elkhart, 15 Mar 1961, 2 adults, H.R. Burke. **Brazos Co.**: Bryan, Sep 1990, 2 adults, C. Moomaw. **San Augustine Co.**: Turkey Creek @ FM103, CPOM in gravel stream, 10 May 1994, 2 adults, SKJ. **San Jacinto Co.**: Sam Houston National Forest, Double Lake, 9 Apr 1977, Reed, Peigler, Plitt. Sam Houston National Forest, Big Creek @ Big Creek Scenic Area, 26 Sep 1992, SKJ; 11 Jun 1995, J.R. Gibson. Sam Houston National Forest, Winter's Bayou @ Lone Star Trail, N of FM 1725, 4 Dec 1993, 4 adults; 4 Jan 1994, 2 adults; 16 Sep 1994; 14 Oct 1994, J.R. Gibson. **Tyler Co.**: US190 @ Big Cypress Creek, 2.7 km W of FM256N, 7 Mar 1992, larva, SKJ.

Genus *Helobata* Bergroth 1888

Helobata larvalis (Horn)

Hydrophilus striatus Brullé 1841: 58

Helopeltis larvalis Horn 1873: 137

Helobata striata; Young 1954: 185, Richmond 1962: 88, Spangler and Cross 1972: 413, Arnett 1973: 223, Brigham *et al.* 1982: 10.79, Arnett 1983: 12-11, Fernandez and Bachmann 1987: 154, Testa and Lago 1994: 50

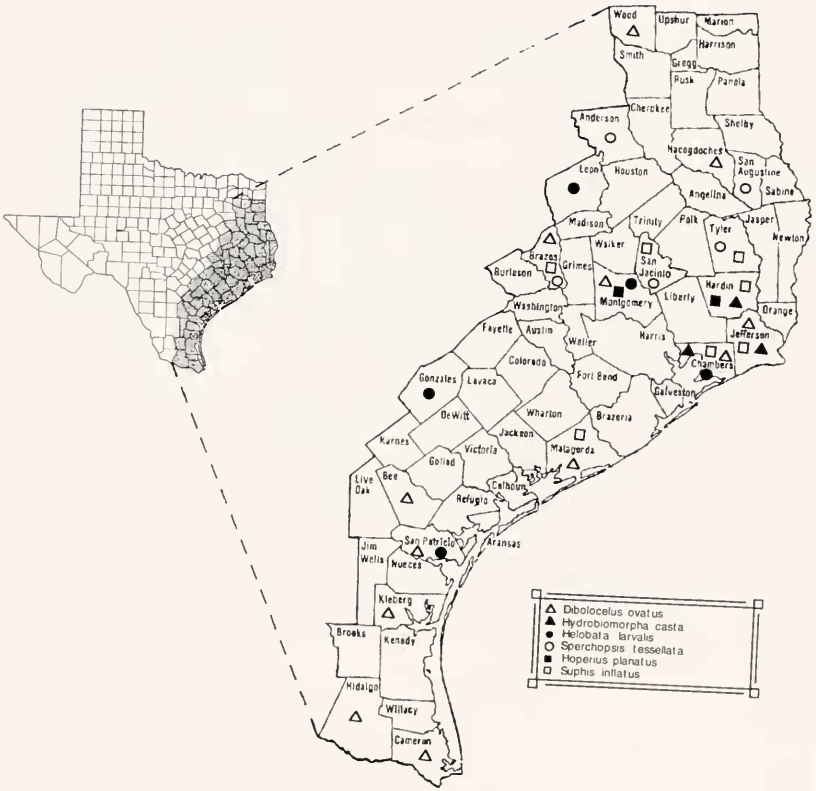
Helobata larvalis; Hansen 1991: 293

Helobata larvalis (Horn), the only species representing the genus *Helobata* in the United States, was until recently known as *Helobata striata* (Brullé). Hansen (1991) noted that the latter name was preoccupied by *Hydrophilus striatus* Say, 1825 (= *Berosus striatus)* and therefore was a primary homonym. The next available name was *Helobata larvalis* (Horn), 1873. The distribution of this species was reported (as *H. striata*) by Spangler and Cross (1972) to range from Buenos Aires, Argentina, north through the West Indies, Central America, Mexico, and along the Gulf Coast to Louisiana and Florida in the United States. Records in both North and South Carolina by Brigham *et al.* (1982) extended the known distribution northward from Florida. Testa and Lago (1994) listed this species from Texas, but because no precise locality data were given for Texas and no other references have been found citing *H. larvalis* in Texas, we are providing distributional data. Our records extend the known distribution of this beetle westward into Texas as far as San Patricio and Gonzales Counties (Map 1).

Young (1954) stated "The peculiar structure of the expanded sides of the body suggests that this insect lives on the surface of submerged vegetation, logs, and other objects in much the manner of a limpet." He also stated that it occurs in brackish as well as freshwater. Information gathered in the present studies agrees with his observations. Specimens of *Helobata larvalis* collected from the Anahuac National Wildlife Refuge marsh site in Chambers County,

Texas (discussed under *Hydrobiomorpha casta*) were found clinging to the underside of floating, decaying vegetation. One noteworthy specimen was a female with the egg case attached beneath the abdomen as described by Spangler and Cross (1972), who also described the eggs and first instar larva of this species. Eighteen specimens are reported here from five Texas counties.

TEXAS RECORDS. Chambers Co.: Anahuac National Wildlife Refuge, 4.9 km SE of Visitor Info Booth, marsh, 30 Jun 1993, 2 adults; 13 Jul 1993; 20 Nov 1993; 9 Apr 1994; 25 May 1994; 15 Jun 1994, adult with egg case; 12 Jul 1994; 21 Nov 1994, RCV. Anahuac National Wildlife Refuge, at light near entrance, 20 Sep 1993, RCV. **Gonzales Co.**: Palmetto St. Park, 7 Jun 1969, 2 adults, Board & Hafernik. **Leon Co.**: Flynn, 8 km N at sand dune at UV light, 24 May 1994, W.B. Godwin & E.G. Riley. **Montgomery Co.**: The Woodlands, 1-2 Aug 1977; 2 Jun 1979, J.E. Wappes. **San Patricio Co.**: Lake Corpus Christi State Park, 9 Jun 1969, Board & Hafernik. Welder Wildlife Refuge, black light, 28 Jun 1969, 2 adults, Board & Hafernik.



Map 1. County records for beetles newly reported from Texas.

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